

his observations. The list of sun-spots at the end of the publication and the various extracts from the note-book will prove very useful to those who are engaged in researches of a similar kind. The observations seem to have been conducted with great care, and Dr. Lohse gives us in every case the exact method by which the measurements have been made.

If we endeavour to review a work which is not being continued, at least for the present, we rather turn to the actual results of the observations than to a mere list of accumulated facts. This list, no doubt, may prove hereafter to be the most important part of the work, yet it is only made important by those who discuss the observations. The more doubtful and hypothetical part, containing the conclusions, is therefore the better test for the moment, for we must not forget that without a guiding idea a mere tabular arrangement of facts is useless.

One of the most curious results of Dr. Lohse seems to be the discovery of a period of fifty days in the eruptive activity of the sun. Dr. Lohse took from the drawings of protuberances published by the Spectroscopic Society of Italy, the area of the protuberances as shown in the drawings for each day, and made a curve in which the times of observation formed the abscissæ and the area of the protuberances the ordinates. This curve first shows maxima and minima corresponding to maxima and minima of sun-spots. It next shows a short period of fifty days. During the years 1871, 1872, and the beginning of 1873, this period was well marked. From the middle of 1873, however, the whole solar activity became so small, owing to its chief periodicity of eleven years, that these secondary maxima cannot any more be distinguished.

We turn now to the spectroscopic observations, in which Dr. Lohse was led to somewhat similar conclusions as Mr. Lockyer. It is a well-known fact, that while nearly all the elements standing at the positive end of the electro-static series are found in the sun, we have as yet obtained no decided evidence of the more electro-negative elements. On the other hand, it is not probable that the sun should not contain so many bodies which play an important part in our world. Both Mr. Lockyer and Dr. Lohse came to the conclusion that we must look in the outer and cooler layers of the sun's atmosphere for evidence of the metalloids, but while Mr. Lockyer assumes that they exist as well in the hotter parts of the solar envelope, but under such conditions that we cannot identify their spectra, Dr. Lohse assumes that they do not exist except in the outer layers of the corona. Dr. Lohse is thus forced to assume a force in the sun which drives all the more electro-negative elements away from its centre. This is an hypothesis which we cannot accept, unless we have independent evidence in its favour, or unless it is the only one which will account for the facts; just as we could not accept Mr. Lockyer's hypothesis, if we had no evidence of changes in spectra produced by variations of temperature and pressure. Mr. Lockyer's hypothesis has a decided advantage over that of Dr. Lohse, for we have recently obtained such strong proofs of the changes of spectra produced by a variation of temperature and pressure, that we cannot help thinking that, had Dr. Lohse been acquainted with all these recent experiments, he would have come to the same conclusion

as Mr. Lockyer. This conclusion, indeed, seems inevitable, if it is once assumed that the metalloids really exist in the sun. It is important to mention that this presence of metalloids in the sun is rendered still more probable by the fact that the red and most likely cooler stars give spectra containing fluted bands.

It is interesting to notice that Dr. Lohse finds many of the unknown dark lines contained in the blue end of the solar spectrum to be reproduced in the spectrum of  $\alpha$  Herculis, and although weaker in that of  $\alpha$  Orionis, while they are absent in that of  $\alpha$  Bootis.

Dr. Lohse does not seem to arrive at any results differing much from those of other observers in his observations on faculæ and sun-spots. It is a matter of regret that he, most likely for the sake of brevity, does not enter more fully into the explanation of his own views. A discussion of ideas described in such a cursory manner is impossible, as such a description is necessarily incomplete.

We hope that Dr. Lohse will have occasion to follow out his researches, and do not doubt that he will be rewarded by most interesting results.

ARTHUR SCHUSTER

#### OUR BOOK SHELF

*The Absorptive Glands of Carnivorous Plants.* By Alfred W. Bennett, M.A., B.Sc., F.L.S., Lecturer on Botany at St. Thomas's Hospital. Read before the Royal Microscopical Society, Dec. 1, 1875. With one plate.

MR. BENNETT notices the occurrence in *Drosera rotundifolia*, *Pinguicula vulgaris*, and *Callitriche verna* of peculiar bodies, which at first sight might be mistaken for stomata, and consisting of two nearly hemispherical cells filled with protoplasm. Each of the hemispheres contain a darker nucleus-like spot, and each is surrounded by a thin-walled cell containing chlorophyll. From these hemispherical bodies are developed the papillæ with thin walls and containing chlorophyll. *Drosera* and *Pinguicula* are carnivorous, and Mr. Bennett suggests that *Callitriche* may also be carnivorous, from the occurrence of these peculiar bodies. It seems probable that they are really as Mr. Bennett thinks, absorptive glands, and they certainly bear a strong superficial resemblance to the quadrifid processes found and described by Darwin in *Utricularia* and *Genlisea*. The subject is a very interesting one, and it is to be hoped that further research will throw more light on the matter. It is rather difficult to get a clear idea of the structures from the plate, which seems a little out of drawing, and rather confusing.

W. R. McNAB

*Reseña de las Rocas de la Isla Volcánica Gran Canaria.* Por Don Salvador Calderon. (Reprinted from the Anales de la Sociedad Española de Historia Natural. Tomo iv.) Madrid 1876.

IN this work, which is appropriately dedicated to M. Berthelot—to whom we owe one of the earliest descriptions of the geology of these interesting islands—the author gives some valuable information concerning the relations of the different classes of volcanic rocks to one another. He also describes some of the vast "Calderas" or craters so characteristic of this group of islands, and notices the theories which have been proposed to account for their origin. Of especial interest, however, is the account which he furnishes of the nature and composition of the different varieties of volcanic rocks, and the classification which he proposes for them. It would appear from this work of Señor Calderon, that the true or "sanidine-

trachytes" have not yet been found in these islands, but that the predominant felspathic constituent of the more acid rocks is always plagioclastic. Hence they are described under the names of Andesite, Trachy-dolerite, and Trachy-diorite. The first of these would appear, from the definition given, to correspond with the well-known lavas of Hungary, the last to resemble the greenstone trachytes or "propylites" of the same country. These trachytic rocks are found to assume at times a vitreous character, thus passing into obsidian; and they occasionally exhibit the perlite modification of structure. The basaltic rocks, noticed by the author, do not appear to offer any features of special interest.

*La Biologie.* By Dr. Charles Letourneau. Bibliothèque des Sciences Contemporaines. (Paris: C. Reinwald et Cie., 1876.)

THIS small work within five hundred and fifty pages gives a concise description, in a popular form, of the phenomena exhibited by living organisms. "C'est une œuvre de vulgarisation," intended for the commencing student and the amateur. Such being the case many important facts have to be omitted, and much has to be embodied in a general form. As in most works many of the broad statements are apt to mislead. It is all very well to say, as does Dr. Letourneau, that the heart is trilobular in the reptiles and quadrilobular in birds, but considering the nature of that organ in the crocodiles, we think its nature in them ought to be mentioned. The title of the work is so all-embracing that we think it can hardly be justified by its contents. Morphology as well as physiology, together with the principles of evolution and classification, are all parts of "biology," nevertheless in the work before us morphology, and the immediate dependents of that science, are not touched upon. A more fitting title would have been "Comparative Physiology, Vegetable, and Animal." Several illustrations are introduced, and these are well selected, most if not all from other works. The descriptions are clear and concise, many too short to be of much service except as a first-book.

*Algebra for Beginners.* By James Loudon, M.A., Professor of Mathematics and Natural Philosophy, University College, Toronto. (Toronto, 1876.)

THIS work is an elementary one, taking the usual subjects up to and including Quadratic Equations. There is a chapter on Exponential Notation, giving a fair exposition of the Theory of Indices. There is nothing noteworthy in the execution: it is quite on a par with many similar text-books in this country, so that the chief point of interest is the information it gives us as to what instruction is given in the subject to the rising generation in Canada. The use of *monomial* strikes us as being affected. The work is exceedingly correctly printed. There are but six mistakes, we think, in the whole book, three of which are in the answers (xv. 3, xxxvii. 14, li. 16). Many of the questions are traceable to English sources.

## LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.]

### Coloured Solar Halos

IN his interesting scientific notes taken in the Himalayas, and printed in the last number of NATURE (p. 393), Dr. Arthur Schuster mentions the frequency of the occurrence, in India, of rainbow-coloured rings round the sun, and states that he has only once seen this phenomenon in England. The apparition of a complete iridescent circle is no doubt rarely seen, but I have, since the winter of 1873-74, when I first observed them, so frequently seen fragments of such rings both in Switzerland and in

England, that their non-occurrence, when thin white clouds are near the sun, seems to me to be the exception rather than the rule. In this country, and generally at low elevations, they are not easily detected by the unassisted eye, but in the high Alps both in summer and winter I have rarely failed to see them, when the sun and a thin white cloud were at the necessary distance from each other; they are, however, much more easily observed when the eye is protected from the glare by the neutral tinted glass which is frequently used for snow spectacles. The first and most vivid iridescent halo I ever saw, appeared projecting from the side of a mountain from behind which the sun was about to rise, near the summit of the Flüela pass, and about 7,000 feet above the sea. This was in the winter of 1873-74, and the thermometer stood at 19° Fahr. Last August and the first half of September I saw them almost daily on the Riffelberg and at Pontresina, and I have repeatedly noticed fragments of iridescent rings during the past autumn and winter in crossing Kensington Gardens about 9.30 A.M. In London, however, the blue and green rays are rarely visible, owing no doubt to their absorption by the murky atmosphere, whilst the orange and red rays easily reach the eye. On Sunday last, with snow upon the ground, I saw, through neutral tinted glass, the orange and red of the halo as the thin edges of clouds approached, or receded from the sun, and on Monday I distinctly saw the green also.

I hold these coloured halos to be a decisive proof of the frozen condition of the clouds in which they appear; firstly, because the cloud seen on the Flüela pass, when the thermometer was 13° below the freezing point, must have been frozen; and secondly, because I have repeatedly seen a portion, at least, of the lower half of the iridescent circle in the high valleys of Switzerland by looking along a field of snow sloping upwards towards the sun, and when the thermometer indicated temperatures varying from -15°·5 Fahr. to +23° Fahr.

It would be worth while to have the occurrence or non-occurrence of these halos daily recorded in our meteorological observatories, as indications of the temperature of the air at great altitudes.

E. FRANKLAND

### On the Evidences of Ancient Glaciers in Central France

IN NATURE, vol. xiii. p. 31, Dr. J. D. Hooker gives some notes of traces of ancient glaciers in Central France, especially in the Mont Dore, and in a following short letter (p. 149 of the same volume), in reference to this notice of Dr. Hooker, the late Mr. G. Poulett Scrope, the celebrated describer of the volcanic regions of that country, calls in question the exactness of Dr. Hooker's observations. Dr. Hooker in a subsequent letter (p. 166) insists upon the correctness of his views, which he seems to believe original and never before advanced. Neither Dr. Hooker nor Mr. Poulett Scrope seem to have known that I have already, in a paper published in the *Ausland* (1872, Nos. 20 and 21, pp. 460 and 512) entitled, "Erosions und Gletscherwirkungen im Mont Dore, &c." described the traces of glaciers to a still greater extent than even Dr. Hooker does. Not only did I name the place in question (which is situated just at the entry of the Gorge d'Enfer, upper valley of Mont Dore) and describe it as an ancient frontal moraine of a glacier, but I have also given the view of the late Prof. Lecoq (who was never an Abbé as Mr. Poulett Scrope seemed to believe), who says in reference to this locality, *that if ever a glacier had existed in Mont Dore it must have been in this valley*. But besides this point, which in itself is decisive, I noticed a great number of other localities affording examples of polished rocks, transported and rounded blocks, stone lines, and other evident traces of glaciers, which I will not re-enumerate, as they may be found in my above-mentioned paper.

It is quite clear that Mr. Poulett Scrope was in the wrong in denying that those signs in the Mont Dore are the effects of glacial action, but on the other hand, I must, in justice to myself, courteously remind Dr. Hooker that I have the priority in describing those marks as glacial traces which Lecoq interpreted as water-flood traces. I may say in conclusion that this learned geologist of Central France (Lecoq) personally turned my attention to those phenomena while visiting the Auvergne in 1867, and seemed inclined to accept my interpretation.

Breslau University, Prussia, March 10 A. VON LASAULX

### The Uintatherium

IN the abstract of my lecture published in NATURE, vol. xiii., p. 387, it is stated that "the first discovered evidences of the